

**REMARKS**

Reconsideration of this application is respectfully requested in light of the above amendments and following remarks. Claim 3 remains cancelled without prejudice or disclaimer. Claims 1, 2, and 4 – 18 are pending in this application. Claim 1, 13 and 15 are the independent claims.

**I. Claim Objections**

Regarding the objections under 37 CFR 1.75(c) as being of improper dependent form in that they failed to further limit the subject matter of the previous claim, claims 13 and 15 have been rewritten in independent form. Thus, Applicant submits this objection has been traversed.

**II. Rejection under 35 USC Section 112**

Claim 1 has been modified to change “effective phase tuning” with “phase tuning” and “non-chilled temperature” has been modified to “room temperature”. Support for phase tuning is found at page 3 beginning at line 30 which states:

“When a DC tuning voltage is applied to the tunable film, the dielectric constant of the film changes, which causes a change in the group velocity, and therefore, produces a phase shift in a signal passing through the waveguide.”

Support for room temperature operation and again regarding phase shifting is found at page 6, line 16 which articulates:

"This invention provides electronic phase shifters that operate at room temperature and include voltage tunable materials. When a DC tuning voltage is applied to the tunable material, the dielectric constant of the material changes, which causes a change in the group velocity and therefore produces a controllable phase shift."

Applicant submits that with the modification of the "effective" and "non-chilled temperatures" language, the 112 rejection is respectfully traversed. Also, Applicant respectfully submits that the new matter rejection has been traversed with the claim language modification with the support for such language set forth above.

### III. No Prima Facie Case of Obviousness Has Been Presented

Claims 1, 4, 5 and 13-18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Vandik, in view of Wolfson et al (US '104) or Sengupta et al. (US '697). Applicant respectfully resubmits that this rejection is respectfully traversed.

Applicant submits that Vendik may address the problem of using a ferroelectric material such as BSTO at room temperature, but he does not disclose how to solve this problem. Nor does the reference disclosure enabling operation of ferroelectric materials in the device of the present invention at room temperature. As Applicant has worked-extensively with the author,

this is first hand knowledge. Applicant reiterates the affidavit by one of the authors of the paper (Mr. A.B. Kozyrev) who has worked extensively with the Applicant and with the assignee of the present invention and articulated to them the problems of operation at room temperature. The Applicant has been researching diligently to overcome these problems and has done so utilizing the material set forth and claimed in the present application.

Each of claims 2, 4 - 12, 14 and 16 - 18 depends from claim 1, which now recite "wherein the tunable dielectric layer comprises a barium strontium titanate (BSTO) composite containing materials that enable low insertion loss and phase tuning at room temperature;" Further, claims 13 and 15 have been rewritten as required by the present office action and, as well, contain the claim requirements of claim one vis-à-vis "containing materials that enable low insertion loss and phase tuning at room temperature;".

Applicant resubmits that in a number of instances, the authors of the paper acknowledged that further research needed to be done in order to operate (i.e., provide tunability) at room temperatures. For example, please see page 337, first paragraph, line 10, which states, "As for microwave applications of ferroelectric at room temperature, to-be-solved problems should be considered". Also, please see, the last paragraph of the conclusion, which states, "some problems concerning the physical phenomenon in ferroelectrics should be solved; that would provide new applications of ferroelectric components at microwaves." Indeed, the Applicant of the present invention has solved one of those problems (operating at room temperature) and has created a device using the tunable material that operates at room temperature: the

## WAVEGUIDE-FINLINE TUNABLE PHASE SHIFTER.

Further examples of the cited paper requiring the operation of the phase shifter at superconducting temperatures include:

Page 325, paragraph 1, line 12: "With the development of high-temperature superconductor techniques, devices operating at liquid nitrogen temperature became more practical. As a result of the progress, the interest in FEs for electronically steerable components has been renewed." This implies, the topic of this paper is based on liquid nitrogen temperatures.

Page 326, column 2, paragraph 2.5, line 6: "The electrodes must be made from superconducting films."

Page 327, column 1, paragraph 4.3, line 14: "In order to develop the STO room temperature components for the microwave applications, the life cycle of STO thin film components under high applied voltage should be carefully investigated." The applicant has carefully investigated these problems and has come up with solutions, such as the composite material that operates without chilling and at room temperatures as claimed in claim 1, to enable the present invention.

Page 336, table IV, entitled, "Possible Direction and Present State R&D in the Area of Ferroelectric Applications of Microwaves": Please note in the second column entitled, "Room Temperature, BSTO thin film structures, problem: high value of  $\tan \delta$ ".

Page 336, paragraph 7, line 4: "That is followed by an elaboration of STO planar structures with the high QFTC which can provide the successful applications of such components

at liquid nitrogen microwaves subsystems. At the same time, the interest to the microwave applications of ferroelectrics at room temperature still does exist." This implies that it would not be obvious to one of ordinary skill in the art to provide a composite such as claimed in claim 1 of the present invention, as at the time this article was written, no such solution existed and the authors noted that more research was needed; research that was provided by the present Applicant and in the present invention.

As the Applicant believes that the rejection of claim 1 has been traversed and claims 2 and 4 - 18 depend therefrom, these claims are believed to be traversed as well.

Accordingly, reconsideration and withdrawal of this rejection is respectfully requested.

**PATENT**

**Serial No. 09/838,483**

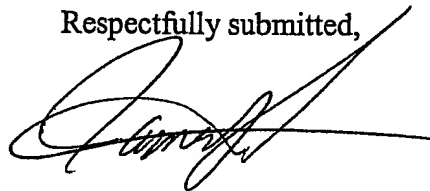
**Docket No. JSF01-0047/WJT008-0009**

**CONCLUSION**

It is respectfully submitted that, in view of the foregoing amendment and remarks, the application is in clear condition for allowance. Reconsideration, withdrawal of all grounds of rejection, and issuance of a Notice of Allowance are earnestly solicited.

The Office is hereby authorized to charge any additional fees or credit any overpayments under 37 C.F.R. 1.16 or 1.17 to Deposit Account No. 50-2697. The Examiner is invited to contact the undersigned at 202-607-4607 to discuss any matter regarding this application.

Respectfully submitted,



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